Without Data Standards, the Mortgage Industry Doesn't Go Digital

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Fannie Mae®

Executive Summary

The mortgage industry has been slow to adopt digitization, but the imperative has become a crescendo. Digital disrupters have raised the bar so high that mortgage borrowers expect the same level of online experience that they get when shopping for consumer goods and services. The rise of financial technology (fintech) companies means increased competition from a consumer business sector that is adopting emerging innovations to increase efficiency while reducing costs and enabling a better customer experience.

While the mortgage industry is finally accepting the challenge to digitize and innovate, they still have a long road ahead. As they continue on that journey, they must keep in mind the often-overlooked importance of data standards to support replicable and sustainable solutions. Data standards are the foundation for the new digital model, providing benefits across the board — from a common vocabulary and taxonomy to reducing inconsistencies, simplifying processes, and improving interoperability. Without this foundation, the mortgage industry does not successfully go digital.

Data standards are the foundation for the new digital model, providing benefits across the board.

Introduction

Multiple pressure points in the industry are forcing companies to realign priorities and to change their approach to doing business. Mortgage lenders are facing increased competition from financial technology (fintech) companies as well as other market forces. Due to the online experience that consumers have become accustomed to from companies like Netflix and Apple, mortgage borrowers have higher expectations for a better digital experience in home buying. A call to digitize the industry is loud and clear. At the same time, lenders are facing thinning margins and a shrinking talent pool. Industry participants who want to survive and ultimately to thrive must rethink their approach.

A call to digitize the industry is loud and clear.

The prospect of making wholesale changes is daunting — but an even worse scenario for legacy lenders is to ignore or underestimate the digital revolution. In the short term, many lenders will continue to avoid large systems overhaul projects. Legacy lenders tend to rely on the same human-based processes that have served them well over the past decade — or longer. These processes allowed them to survive the default crises and to handle the ensuing new regulatory compliance hurdles. The legacy model has a high fixed-cost profile and is not agile. As competitors move to a much nimbler approach based on leveraging standards and emerging technologies, the legacy lenders will eventually reach a point where they cannot cut variable costs any more and ultimately may be forced to exit the industry.

Enhancing the borrower experience through portal and workflow technology is increasing as new fintech entrants change the long-standing rules of the game. The use of independent verification of income and assets, and technology-enabled approaches to verifying property values, are being leveraged across more progressive companies. Others are looking to leverage machine learning and artificial intelligence (AI) to eliminate redundant quality control (QC) functions and reduce human labor.

The demand for mortgage lenders to automate and digitize if they want to survive is becoming obvious to most. What is less obvious is that industry data standards are the essential foundation to support the new digital model. Ultimately, a business solution set composed of both new technology and comprehensive data standards will emerge, enabling participants to migrate away from the current high-cost, human-centric approach to one that is highly automated.
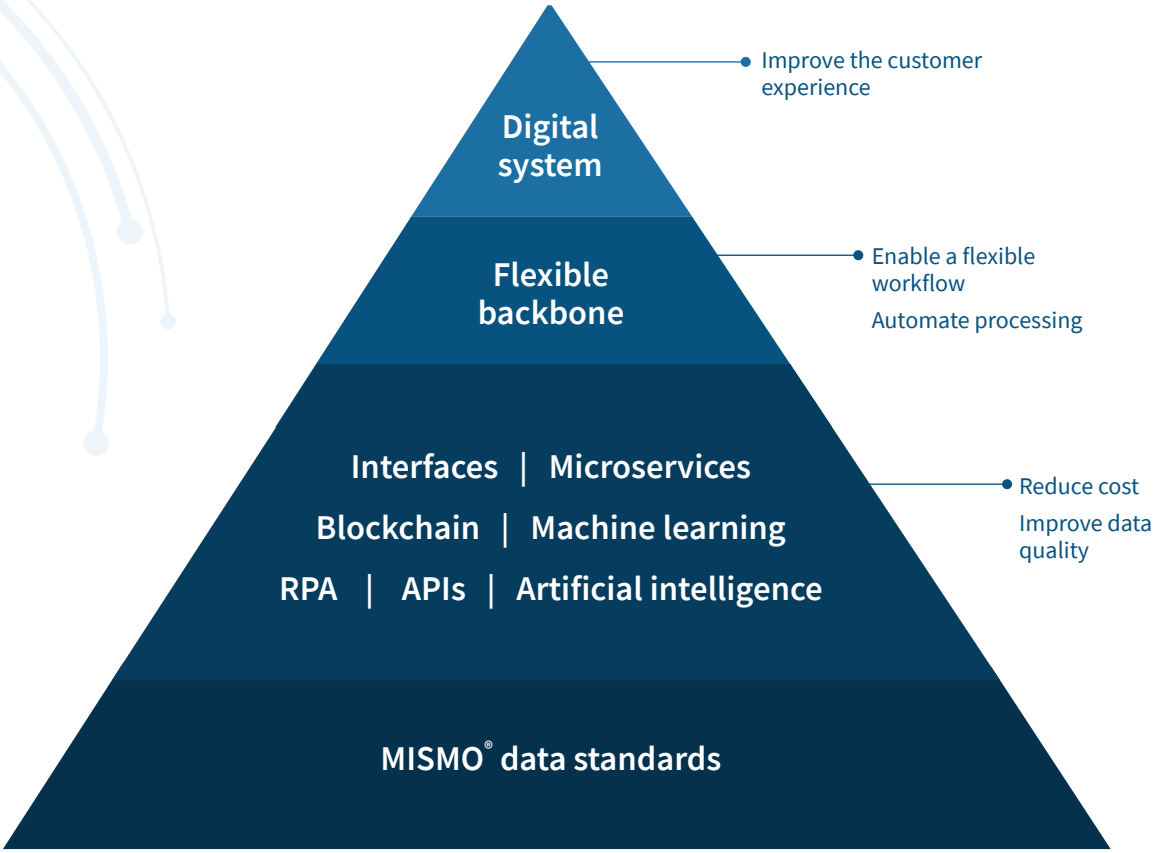
Digital system

Flexible backbone

Interfaces | Microservices

Blockchain | Machine learning

RPA | APIs | Artificial intelligence

MISMO® data standards

Improve the customer experience

Enable a flexible workflow

Automate processing

Reduce cost

Improve data quality

Figure 1 — MISMO data standards are the foundation for the digital revolution in the mortgage industry.

The Digital Revolution

The borrower experience

Companies such as Amazon have given consumers the power to make purchasing decisions in the moment, at the click of a button, with full product and price transparency. Buyers can see a near-endless variety of product options and price points. They can evaluate other buyers' experiences with products and vendors through buyer ratings and feedback. Amazon has created a level playing field where the buyer controls the process.

Contrast the Amazon experience to the traditional mortgage industry, where the lending process is dominated by the loan officer and a mysterious set of other processors until the borrower is told to come to the closing. The borrower has little insight into the process and is only notified when they need to participate. Several individuals may contact the borrower asking for the same information multiple times. The experience is confusing at best, and for some borrowers it is so bad that they may choose not to go through the experience again.

In Fannie Mae's 2018 report "What to Digitize First, According to Recent Homebuyers,"[1] 66 percent of homebuyers surveyed expressed interest in a fully digital process for obtaining a mortgage. Further, when asked what parts of the process could have been made easier, 27 percent cited reduction in the required paperwork, 20 percent indicated that they wanted to see a variety of lenders and prices, and 16 percent wanted less back-and-forth with the lender. It is clear that mortgage borrowers want a different experience.

Lenders are beginning to recognize changing borrower expectations and what that means for the industry's future. According to a study by the Mortgage Bankers Association and Celent, mortgage lenders reported significant increases in technology spending from 2017 to 2018 to help them interact with borrowers more effectively.[2] For example, 52 percent of survey participants said they were increasing spending for borrower portal technology to improve the borrower

1   "What to Digitize First, According to Recent Homebuyers," *Fannie Mae National Housing Survey Q1 2018 Topic Analysis*, www.fanniemae.com/resources/file/research/housingsurvey/pdf/nhs-special-topic-digital-mortgage-process.pdf.
2   "Technology Spending Survey 2018, Loan Origination Process," MBA and Celent, September 2018, www.mba.org/news-research-and-resources/research-and-economics/single-family-research/technology-profile-surveys (accessed April 23, 2019).

experience. Similarly, 50 percent reported spending more on mobile application technology, and 46 percent said they were increasing spending on borrower document upload and viewing capabilities. These findings appear to align with the findings from Fannie Mae's 2018 survey.

Another Fannie Mae survey conducted in the second quarter of 2019 found continuing and heightened lender focus on the borrower experience in the face of fintech competition: "Mortgage lenders continue to cite 'consumer-facing technology' as the most important business priority to maintain competitiveness, according to Fannie Mae's Mortgage Lender Sentiment Survey® (MLSS). Additionally, most lenders consider 'online business-to-consumer lenders' as their biggest competitor, citing their advantages in technology."[3]
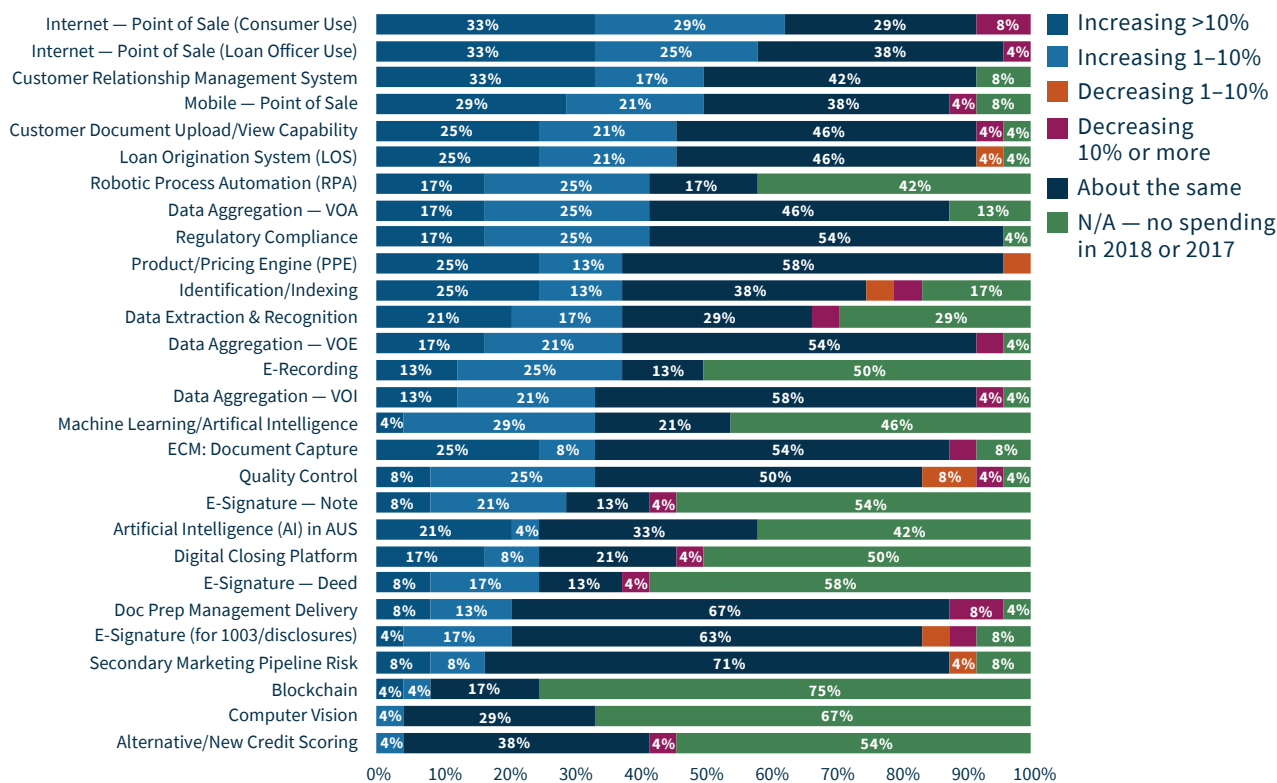

Figure 2 — Mortgage lender technology spending increases and decreases. Source: MBA and Celent: "Technology Spending Survey 2018, Loan Origination Process."[4] Used with permission. © Mortgage Bankers Association 2018.

3   Andrew Peters, "Technological Investment Necessary in Evolving Mortgage Landscape, Lenders Say," Fannie Mae, July 18, 2019, www.fanniemae.com/portal/research-insights/perspectives/technological-investment-peters-071819.html (accessed July 18, 2019).
4   www.mba.org/news-research-and-resources/research-and-economics/single-family-research/technology-profile-surveys.

Fannie Mae believes that the movement to a more borrower-centric model is not only gaining momentum, but will become predominant as we move into the next decade. We may see a convergence of the borrower interaction with both real estate professionals and lenders, resulting in a more seamless experience in purchasing and financing a home. Many of the current interactions with the real estate agents and lenders will be complemented and enriched by technology solutions on both traditional and more modern platforms, including desktop, web, chat, telephony, tablet, and mobile. Many applications will have backend integrations to data suppliers and analytical models supporting property valuation, income and asset verification, and borrower credit. This will increase both certainty and transparency throughout the home-buying process. The use of standard application programming interfaces (APIs) will facilitate the use of multiple channels, allowing borrowers to manage their experiences and lenders to manage risk.

Rise of the fintechs and newer entrants to the market

Fintech companies began entering the market nearly 10 years ago and launched disruptive technologies that allow for simpler integrations, resulting in a better customer experience and potentially lower costs. Fintech firms like CommonBond entered consumer and student lending markets and changed the landscape significantly. Over the past several years, new companies have entered the mortgage technology market, taking market share away from traditional players while also providing solutions that translate into a better borrower experience and greater transparency. Some of these players are integrating with Fannie Mae's digital processes, such as Day 1 Certainty®, resulting in faster loan closings with fewer errors.

Some mortgage lenders have specifically branded themselves as fintech lenders. A report by the Federal Reserve Bank of New York said the defining features of this business model are an "end-to-end online mortgage application platform and centralized mortgage underwriting and processing augmented by

automation."[5] It is not surprising that four of the top 20 mortgage originators in 2017 were fintech lenders. Examples include Quicken Loans with its Rocket Mortgage® and online lender LoanDepot.

Rank	Type of lender	Lender name	Total originations volume (in billions)	Market share (% of $)	Fintech since
1	Large depository	Wells Fargo	$93.6	5.57%	
2	Fintech	Quicken Loans	$81.3	4.84%	2010
3	Large depository	JPMorgan Chase	$53.1	3.16%	
4	Large depository	Bank of America	$46.6	2.77%	
5	Fintech	loandepot.com	$33.9	2.02%	2016
6	Non-depository	Caliber Home Loans	$31.6	1.88%	
7	Non-depository	United Shore	$29.4	1.75%	
8	Large depository	Flagstar	$23.1	1.37%	
9	Large depository	U.S. Bank	$22.7	1.35%	
10	Non-depository	Fairway Independent	$19.6	1.17%	
11	Fintech	Guaranteed Rate	$18.4	1.09%	2010
12	Non-depository	Freedom Mortgage	$16.5	0.98%	
13	Non-depository	Guild Mortgage	$15.2	0.91%	
14	Non-depository	Finance of America	$14.8	0.88%	
15	Large depository	Navy Federal	$14.6	0.87%	
16	Large depository	USAA Federal Savings	$13.7	0.82%	
17	Community bank	Plains Capital	$13.4	0.80%	
18	Non-depository	HomeBridge	$13.1	0.78%	
19	Fintech	Movement Mortgage	$12.8	0.76%	2014
20	Non-depository	Stearns Lending	$12.7	0.75%	

Figure 3 — Top 20 residential lenders for the U.S. in 2017 based on Home Mortgage Disclosure Act (HMDA) data. Source: Mortgage Bankers Association analysis using 2017 Home Mortgage Disclosure Act data.

The keys to the success of mortgage fintechs have been rapid technology development, providing high value to consumers, and leveraging emerging technology tools. The mortgage industry is paying closer attention to how these newer players are improving workflows and customer experiences.

5   Andreas Fuster, Matthew Plosser, Philipp Schnabl, and James Vickery, "The Role of Technology in Mortgage Lending," *Federal Reserve Bank of New York Staff Reports*, No. 836, February 2018, www.newyorkfed.org/medialibrary/media/research/staff_reports/sr836.pdf (accessed April 23, 2019).

Emerging Tech Drives More Efficient Ways to Do Business

Fintech and other lenders are adopting emerging technologies to increase efficiency, reduce costs, improve data quality, and enable a better customer experience. These technologies include:

- **Robotic Process Automation (RPA)**. Lenders can use RPA to replace many QC and regulatory compliance activities currently performed mostly by humans.

- **Machine Learning and Artificial Intelligence (AI)**. Machine learning and AI can also eliminate redundant QC functions and eliminate human labor. Machine learning combined with workflow can optimize process steps in relation to borrower experience, cost, and time to close.

- **Blockchain**. Blockchain supports integration and data synchronization across the industry. This will improve efficiency by reducing costly and custom point-to-point interfaces, minimizing data quality issues, and providing a trusted and consistent system of record (or golden copy).

- **Application Programming Interfaces (APIs) and Microservices**. APIs are not new, but they are increasingly being used by the mortgage industry. APIs and microservices support:

  - Prompter responses to customers (e.g., to validate data; get income, employment, and asset information required on the Uniform Residential Loan Application [Form 1003]; determine eligibility for appraisal waivers, etc.).

  - Providing multiple borrower channels (e.g., desktop and mobile applications).

  - Seamless integrations with lender systems.

Is the mortgage industry ready to embrace these technology innovations to counter the challenges it is facing?

New Pressures on the Mortgage Industry

Margin compression

The mortgage business is sensitive to market volatility and is especially impacted by rising and falling interest rates. When rates rise and origination volumes decrease, many industry players see costs per unit increase due to high fixed costs and tiered pricing for services and technology. When rates fall, the industry struggles to keep up with rising demand for mortgages. In the past couple of years, many players have implemented large layoffs,[6] while others such as Capital One have exited the mortgage industry.[7]

Shrinking talent pool

Lenders are competing with Silicon Valley and others for tech workers, and they face a shrinking talent pool amid low unemployment levels.[8] Attracting and retaining qualified technical staff requires investment in training and increased wages. Lenders are faced with a hard-to-sustain demand for staffing up and scaling back through economic cycles.

The shortage of qualified workers is seen not just in mortgage originations, but across many areas of the real estate industry. For example, the number of residential appraisers has dropped in the past few years, and that workforce is overwhelmingly over the age of 50. But the mortgage industry is finding that in many cases, technology innovation can help qualified professionals be more productive.

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6   "Layoffs," *National Mortgage News*, www.nationalmortgagenews.com/tag/layoffs (accessed July 8, 2019).
7   Jennifer Surane, "Capital One Exits Mortgage Origination Business, Cuts 1,100 Jobs," *Bloomberg*, November 7, 2017, www.bloomberg.com/news/articles/2017-11-07/capital-one-exits-mortgage-origination-business-cuts-1-100-jobs (accessed July 8, 2019).
8   See, for example, Gaurav Verma, "How Banks Can Win the Struggle for Tech Talent," *American Banker*, September 5, 2018, www.americanbanker.com/opinion/how-banks-can-win-the-struggle-for-tech-talent (accessed July 18, 2019).
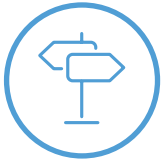
Process inflexibility

Two driving forces in today's mortgage industry impact one another but do not intersect elegantly. On the one hand, borrowers and loan officers are demanding a much better experience as the lending process moves from application through closing. On the other hand, to keep costs low, lenders look for a rigid and standard process that can be replicated easily. The problem is how these two forces can be aligned.

The demand for process flexibility requires robust plug-and-play capability with a flexible backbone. Many companies that leverage traditional software cannot achieve flexibility due to the straight-through nature of traditional loan origination system (LOS) platforms. Achieving process flexibility often requires the use of nonstandard and manual processes that directly conflict with the desire for a low-cost and repeatable process.

We are at a crossroads between the traditional or legacy mortgage processes and the digital one that both borrowers and lenders want.

The Benefits of Data Standards

Fannie Mae and Freddie Mac (the government-sponsored enterprises, or GSEs) historically have relied on regulatory mandates to drive adoption and acceptance of data standards. In addition, many lenders have struggled to absorb the cost of adopting new technologies and resources that enabled the sharing of mortgage data — and yet without that investment, they may not survive.

Emerging technologies hold tremendous promise for the industry.

Emerging technologies hold tremendous promise for the industry and are enhanced when paired with the Mortgage Industry Standards Maintenance Organization® (MISMO®) data standards. For example, a lender could use RPA to have machines check 100 percent of loan data and documents in far less time than humans, and with limitless scale. Combining RPA with industry data standards could create a highly replicable and scalable model. MISMO data models also can be the basis for blockchain ledgers. And applying MISMO data standards to APIs allows counterparties to integrate using a common language that can avoid costly transformation and data issues.

Most mortgage lenders rely on industry technology providers to power their business and continuously innovate. So it is eye-opening that a Fannie Mae survey of mortgage technology providers identified "lack of industry-wide data standards" as the top barrier to adoption of new technology and tools.

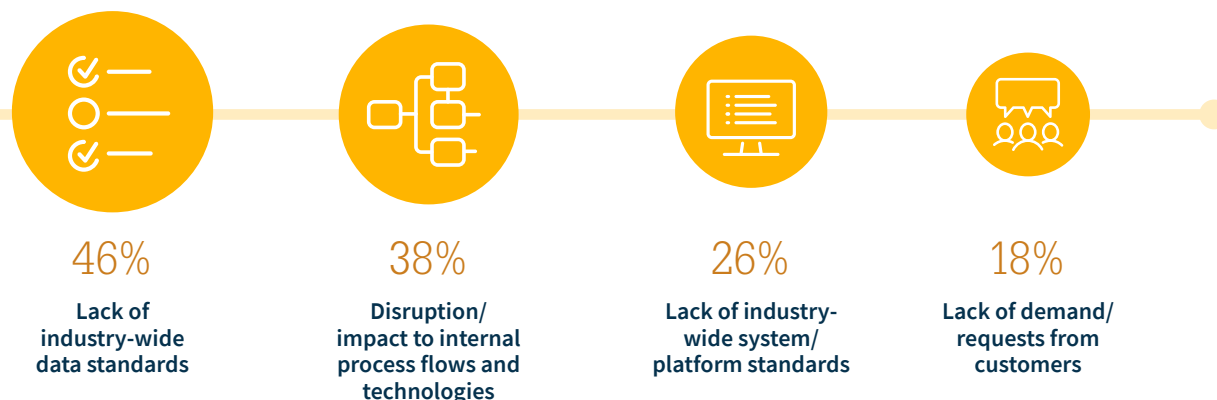| 46%	38%	26%	18%
Lack of industry-wide data standards	Disruption/ impact to internal process flows and technologies	Lack of industry-wide system/ platform standards	Lack of demand/ requests from customers

Figure 4 — Challenges that affect the adoption rate of new technology. Source: Fannie Mae survey research, February 2019.

Creating and adopting the MISMO data standards required an investment by the industry. Going forward, the combination of these data standards and new interfaces, APIs, and emerging technologies will drive loan processing efficiencies and streamline operations that can mitigate the pain of adoption.

Common vocabulary and taxonomy improve consistency, quality, and interoperability

MISMO standards define terms and offer a common language that industry participants rely on. For years, MISMO has offered the industry a standard XML schema that is the basis for the Uniform Mortgage Data Program (UMDP) and other implementations of the standard, such as for Home Mortgage Disclosure Act (HMDA) data requirements. Now MISMO is creating two other artifacts that leverage and improve the standard.

The business glossary being developed by MISMO will define the taxonomy and ontology for mortgage data. This will allow for the use of the standard in transactions, contracts, and regulations that require specific understanding of the meaning of terms.

MISMO is also creating an implementation-agnostic data model. Many companies prefer the use of JSON over XML, while others want to use older formats, such as fixed-width or delimited. The implementation-agnostic model will enable technologies to interoperate regardless of platform.

By providing a common vocabulary and taxonomy, data standards are the foundation for a consistent, end-to-end digital solution across the mortgage industry.

Elimination of friction in data movement across counterparties

MISMO standards facilitate both a common vocabulary and a common meaning across counterparties. Prior to the creation of the Uniform Appraisal Dataset (UAD), the number of bathrooms in a home might be listed on an appraisal report as either X.1 or X.5 — both intended to mean X full bathrooms plus one half-bathroom. MISMO data standards eliminate this confusion. In MISMO, each data point has a name, definition, data type, length, and range of allowable values. For example, the MISMO-based UAD standardized many text fields that were previously free-form with a list of defined enumerated values. This common meaning allows for the development of rules and logic that compare and evaluate the data across multiple sources. It simplifies interfaces both across and within organizations.

> By aligning on a single standard, costly data transformations are reduced or eliminated.

Before the UAD standard was widely adopted, the Uniform Collateral Data Portal® (UCDP®) accepted appraisals in many different formats (e.g., ACI, AI Ready, UAD 2.6, and PDF). Custom code was required to understand each format and transform the appraisal data to a single common format. Eventually, the older formats were retired, and UCDP now allows only UAD-compliant submissions for the majority of appraisal reports. Data transformations or ETL (Extract, Transform, and Load) processes are also a common part of interface development. By aligning on a single standard, costly data transformations are reduced and/or eliminated.

Certain property types, such as manufactured homes, continue to be excluded from the current UAD standard. These "non-UAD" appraisals often contain nonstandard data, which hinders efficiency. For example, the appraisal effective date can be submitted using different formats — January 1, 2019, could be expressed as 2019/01/01, 1/1/2019, 1/1/19, January 1st, 2019, etc. Because multiple date formats are accepted for non-UAD appraisal reports, scrubbing logic is required. This logic doesn't cover every possible date variant, and dates that don't get scrubbed cause issues in downstream logic — often requiring manual intervention that slows down the loan processing.

The GSEs are working to implement a new UAD 3.x standard that will cover all property types. Validating mortgage data upfront to conform to the MISMO standards will reduce or eliminate the need for scrubbing logic, reduce manual work, and speed up the loan processing.

Innovation example: Collateral Underwriter®

The creation a decade ago of the MISMO-based UMDP data standards has enabled innovation in the mortgage industry after arguably decades of little focus on progress. For example, the MISMO-based Uniform Appraisal Dataset enabled development of Fannie Mae's Collateral Underwriter® (CU®).

In 2005, Fannie Mae and Freddie Mac (GSEs) released uniform appraisal report forms covering single-family homes, condominiums, small residential income properties, manufactured homes, and cooperative properties. This collaborative effort was the precursor to appraisal data standardization.

With the first standardized appraisal data available, in 2009, the GSEs launched the UCDP, a jointly owned technology platform that allows lenders and their agents to submit appraisal reports to the GSEs. The standardized format for most appraisals allows them to be evaluated for data quality and compliance with the GSEs' selling policies. In 2012, the Federal Housing Finance Agency (FHFA) mandated the "successful" submission of an appraisal for all non-exempt loans (the majority of loans) delivered to the GSEs. The Federal Housing Administration (FHA) also adopted the UAD, replacing several older proprietary formats and the use of paper-based forms. UAD adoption by FHA along with

the GSEs simplifies integrations with investors and across counterparties. The progress from 2009 to 2012 allowed the GSEs to require appraisals electronically in mostly digital form and to programmatically evaluate the underlying risk.

Fannie Mae released CU in 2015, taking a big step forward in collateral risk analysis. CU performs model-derived and market-specific analytics on the standardized appraisal data and provides a risk score (on a scale of 1 to 5, with 5 being the riskiest) on each appraisal report. Approximately 60 percent of appraisals receive a CU risk score of 2.5 or less and thus qualify for relief of lender reps and warrants on property value. This incentivizes the submission of quality appraisals to Fannie Mae with the goal of reducing risk and providing lenders with Day 1 Certainty.

The combination of standardized appraisal data and CU's advanced analytics also enabled Fannie Mae to launch Appraiser Quality Monitoring, an ongoing process to identify appraisers whose appraisal reports exhibit a pattern of inconsistencies, and Fannie Mae contacts them for training and educational purposes and provides them an opportunity to improve their work.[9]

Data standards across the broader financial system

To better understand loan risk and to build a customer-friendly mortgage process, lenders may need to access additional data from the broader financial industry. This includes data about properties, rents, utilities, neighborhoods, real estate agents, borrower transaction history, employment, and property title.

In addition to the MISMO data standards, other financial data standards and their related APIs allow for easier and more secure access to critical financial data. For example, the Financial Data Exchange (FDX) data standard and the FDX API allow lenders and investors to securely verify a borrower's assets and income using a standardized dataset. This reduces loan risk and the work required for a borrower to find and upload financial documents, resulting in a better customer experience.

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9   More information is provided on Fannie Mae's Appraiser Quality Monitoring page.

Conclusion

Lenders are facing many challenges: fluctuating origination volumes, increasing costs, higher expectations from borrowers, and increasing competition from new, technology-savvy entrants. To compete in this environment — to even expect to stay in business — legacy lenders must be willing to abandon rigid and inefficient platforms and processes in favor of cutting-edge automation and digitization.

Data standards, including MISMO, are the common language that drives data consistency and quality and enables efficiency in the transfer of data across and within the industry. In the long term, data standards lower the cost of developing new solutions and maintaining existing ones. Data standards are the foundation for a fully digital mortgage ecosystem, from initial borrower contact to loan funding and servicing, resulting in a better customer experience and more efficient business model.

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is Vice President – Digital Shared Services reporting to the Senior Vice President and Head of Digital Products. Bhogaraju has over 16 years of experience in technology and the mortgage banking industry. He leads Digital Products' business architecture, rules, and data function — integrating business needs with technology capabilities. He also oversees the transformation of the Customer Identity and Access Management Program, providing a simpler, more digital experience for customers using Fannie Mae's products. Bhogaraju's team impacts the digitization of the mortgage loan lifecycle, aligning it with company strategy and goals, and collaborates with the industry and regulators to develop industry standards.

Sandro Barchitta

is a Senior Manager of Strategic Product Management in the Single-Family Division at Fannie Mae, where he is responsible for developing and delivering solutions and strategies as part of business and industry transformation efforts. As a member of the joint GSE Uniform Mortgage Data Program (UMDP), Sandro worked on Uniform Loan Application Dataset (ULAD), Uniform Loan Delivery Dataset (ULDD), Uniform Closing Disclosure (UCD), V3 eNote Specification, and Uniform Mortgage Servicing Dataset (UMSD) efforts.

John Burgess

is a Senior Business Analyst in Digital Products at Fannie Mae where he develops business strategy for Fannie Mae's appraisal processing systems. He has over 30 years of experience in software design and development, including 17 years in the mortgage industry. John was instrumental in the implementation of the Uniform Collateral Data Portal (UCDP) for Fannie Mae and is currently working to advance the Uniform Appraisal Dataset (UAD) and the related systems across the industry to a new version.

Noah Israel

is a Director of Product Development in Digital Products at Fannie Mae. He has nearly two decades of experience managing digital products, agile teams, business relationships, and strategic growth opportunities for Fannie Mae in Washington, D.C. Throughout his career, Noah has focused on building high value solutions that ensure compliance and focus on customer needs. Noah currently manages the numerous data standards under the Uniform Mortgage Data Program (UMDP), including Closing Data (UCD), Appraisal (UAD), Application (ULAD), and Delivery (ULDD). Noah led the development and deployment and continues the management of the federally mandated, electronic appraisal records system — the Uniform Collateral Data Portal (UCDP).